

حمل الآن

مجاناً وحصرياً

امتحانات رقم (1)

الترم الاول



Exam model 1



for general stream students

Choose the correct answer for the questions 1 : 20

- 1 The electron (term) was not known before the atomic model of

(a) Rutherford.
(b) Bohr.

(c) Thomson.
(d) Bohr after being modified.
- 2 Both Thomson and Rutherford agreed that

(a) the atom is neutrally charged.
(b) the nucleus is positively charged.

(c) the atom is a homogeneous sphere.
(d) the atom is a solid sphere.
- 3 The line spectrum study enables us to know

(a) the element isotopes.

(b) the energy levels in the element atom.

(c) the composition of the element nucleus.

(d) the number of neutrons in the element nucleus.
- 4 The scientist who disproved Bohr's postulate about the presence of regions in the atom forbidden for electrons is

(a) Rutherford.
(b) Heisenberg.
(c) Schrödinger.
(d) Thomson.
- 5 The electron which has the two quantum numbers ($n = 4, \ell = 3$) is found in the sublevel

(a) $3d$
(b) $4f$
(c) $4d$
(d) $4p$
- 6 The number of electrons by which the sublevel is saturated can be estimated from the relation

(a) $2(2\ell + 1)$
(b) $2\ell + 1$
(c) $2n^2$
(d) n^2
- 7 How many completely filled orbitals are found in carbon atom ${}_6\text{C}$ in its ground (stable) state?

(a) 1
(b) 2
(c) 3
(d) 5
- 8 What is the atomic number of the element which the principal energy level ($n = 3$) in its atom contains 16 electrons ?

(a) 17
(b) 23
(c) 25
(d) 28

- 9 Which of the following shows the location of the element $_{73}\text{X}$ in the periodic table ?
- (a) Period : 5 / Group : 7 (b) Period : 6 / Group : 13
(c) Period : 6 / Group : 5 (d) Period : 5 / Group : 5
- 10 How many half filled orbitals are found in the atom of the trivalent representative metal which lies in p-block ?
- (a) 1 (b) 2 (c) 3 (d) 4
- 11 The electron configuration of X^{3+} ion of an element end with $6s^0, 4f^{14}, 5d^8$
What is the number of the group of this element in the periodic table ?
- (a) 8 (b) 10 (c) 11 (d) 9
- 12 Which of the following ions has the largest radius ?
- (a) F^- (b) Li^+ (c) I^- (d) Rb^+
- 13 Farther distance between the last electron and the nucleus leads to
- (a) higher electron affinity for the element.
(b) easier loss of this electron.
(c) stronger attraction forces between this electron and the nucleus.
(d) higher electronegativity.
- 14 250 mL volume of 0.25 M NaCl solution is diluted with water until the volume becomes 500 mL
What is the concentration of the dilute solution ?
- (a) 0.167 M (b) 0.125 M (c) 0.833 M (d) 0.0167 M
- 15 What is the element which can form an ion with the charge +2 ?
- (a) Selenium $_{34}\text{Se}$ (b) Silicon $_{14}\text{Si}$
(c) Strontium $_{38}\text{Sr}$ (d) Iodine $_{53}\text{I}$
- 16 Zinc oxide reacts with caustic soda as
- (a) amphoteric oxide. (b) acidic oxide.
(c) basic oxide. (d) neutral oxide.
- 17 Which of the following is correct about elements oxides ?
- (a) All metal oxides are basic oxides.
(b) All nonmetal oxides can react with acids.
(c) Water and carbon monoxide are neutral oxides.
(d) Metal oxides react with acids yielding salt and hydrogen.

18 What is the oxidation number of phosphorus in pyrophosphate ion (P_2O_7)⁴⁻ ?

- (a) +3.5 (b) +5 (c) +7 (d) +10

19 The combustion equation of glucose in excess of oxygen gas is :



What is the volume of oxygen gas (at rtp) required to produce 150 g of carbon dioxide ?

[C = 12, O = 16]

- (a) $\frac{24 \times 150}{44}$ (b) $\frac{22.4 \times 150}{44}$ (c) $\frac{15 \times 22.4}{44 \times 6}$ (d) $\frac{15 \times 24}{44 \times 6}$

20 In the reaction : $\text{Ni} + 2\text{HCl} \longrightarrow \text{NiCl}_2 + \text{H}_2$

Which of the following acts as the reducing agent ?

- (a) Nickel ions. (b) Nickel atoms.
(c) Hydrogen ions. (d) Hydrogen gas.

Answer the essay questions 21, 22

21 Write the balanced equations of the two half reactions of this redox reaction :



Then show the oxidizing and the reducing agents.

22 Write the quantum number of the 19th electron in chromium atom ${}_{24}\text{Cr}$

Exam model 2



for general stream students

Choose the correct answer for the questions 1 : 20

1 The molecular formula of the compound whose empirical formula is CH and its molar mass equals 104 g/mol is

[C = 12, H = 1]

- (a) C_2H_2 (b) C_8H_{10} (c) C_8H_8 (d) C_6H_6

2 The number of the half filled orbitals in phosphorus atom ${}_{15}\text{P}$ is

- (a) 1 (b) 2 (c) 3 (d) 4

3 The oxidation number of chromium in $\text{Al}_2(\text{Cr}_2\text{O}_7)_3$ is

- (a) +2 (b) +3 (c) +6 (d) -3

4 The number of the half filled orbitals in Mn^{2+} is (X), while the number of the half filled orbitals in its atom is (Y).

What is the relation between (X) and (Y) ?

[Mn = 25]

- (a) $X = Y$ (b) $X < Y$ (c) $X > Y$ (d) $X = 2Y$

5 In terms of the equation : $2\text{KNO}_3 \xrightarrow{\Delta} 2\text{KNO}_2 + \text{O}_{2(g)}$

What is the mass of KNO_3 required to produce 3.01×10^{23} molecules of oxygen gas ?

- (a) 101 g (b) 202 g [K = 39, N = 14, O = 16]
(c) 50.5 g (d) 25.25 g

6 The element $_{21}\text{X}$ is a

- (a) main transition element in period 5 (b) main transition element in period 4
(c) representative element. (d) noble element.

7 The compound with the highest acidity property of the following is

- (a) HCl (b) HF (c) HI (d) HBr

8 An element with electron configuration ends with $3d^6$, the number of electrons of the penultimate principal energy level in its atom is

- (a) 2 (b) 14 (c) 6 (d) 8

9 The first to explain the line spectrum for element was

- (a) Bohr. (b) Rutherford. (c) Schrödinger. (d) Thomson.

10 According to the unbalanced equation :



Which of the following is correct ?

- (a) The balanced reduction equation is : $\text{Ag}_{(aq)}^+ + e^- \longrightarrow \text{Ag}_{(s)}$
(b) The overall equation is : $\text{Mg}_{(s)} + \text{Ag}_{(aq)}^+ + \text{NO}_{3(aq)}^- \longrightarrow \text{Ag}_{(s)} + 2\text{NO}_{3(aq)}^-$
(c) $\text{Ag}_{(aq)}^+$ and $\text{NO}_{3(aq)}^-$ ions are spectator ions.
(d) The net ionic equation is : $\text{Mg}_{(s)} + 2\text{Ag}_{(aq)}^+ \longrightarrow 2\text{Ag}_{(s)} + \text{Mg}_{(aq)}^{2+}$

11 The strongest alkali of the following is

- (a) $\text{Ca}(\text{OH})_2$ (b) KOH (c) LiOH (d) $\text{Mg}(\text{OH})_2$

12 The metals which lie in the beginning of the periods are characterized by

- (a) small atomic size. (b) high ionization potential.
(c) high electronegativity. (d) low ionization potential.

13 The oxidation number of sodium in sodium peroxide is

- (a) -2 (b) -4 (c) -1 (d) +1

14 Regarding the reaction : $\text{H}_2\text{S} + \text{SO}_2 \longrightarrow 3\text{S} + 2\text{H}_2\text{O}$

What is the type of this reaction ? What is the oxidizing agent in it ?

Choices	Type of reaction	Oxidizing agent
(a)	Disproportionation reaction	S^{4+}
(b)	Comproportionation reaction	S^{2-}
(c)	Disproportionation reaction	S^{2-}
(d)	Comproportionation reaction	S^{4+}

15 The penetration of most of the alpha particles in Rutherford's experiment indicates that

- (a) most of the atom is space. (b) the number of the energy levels is high.
(c) the nucleus is positively charged. (d) the atom is solid.

16 Which of the following sublevels has the least energy ?

- (a) 3d (b) 4s (c) 3p (d) 2p

17 Quantum numbers of the last electron in a sublevel are ($n = 4$, $\ell = 2$, $m_\ell = 0$, $m_s = -\frac{1}{2}$), the number of electrons found in this sublevel is

- (a) 8 (b) 10 (c) 3 (d) 5

18 The table below shows the first five ionization potentials of the element (X) :

Ionization potential order	First	Second	Third	Fourth	Fifth
Ionization potential (kJ/mol)	+738	+1450	+7733	+10543	+13630

What is the chemical formula of the compound resulting from its combination with chlorine ?

- (a) XCl_2 (b) X_2Cl_3 (c) XCl_3 (d) XCl

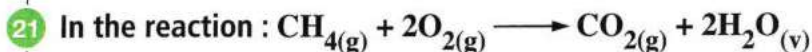
19 Rutherford used a foil of a metal in its experiment, the electron configuration of this metal ends with

- (a) $4d^9$ (b) $4d^{10}$ (c) $5d^9$ (d) $5d^{10}$

20 What happens to the regions of space between the levels on moving from ($n = 1$) to ($n = 4$) ?

- (a) They decrease. (b) They do not change.
(c) They increase uniformly. (d) They increase irregularly.

Answer the essay questions 21 : 24



What is the limiting reactant when 8 g of CH_4 gas are mixed with 16 g of O_2 gas ?

[C = 12 , H = 1 , O = 16]

.....

.....

22 Show by a balanced symbolic equation the reaction of aluminum oxide as an amphoteric oxide.

.....

.....

23 Explain : HNO_3 acts as an oxidizing agent, while NH_3 acts as a reducing agent in the redox reactions.

.....

.....

24 Show the electron configuration of the element ${}_{24}\text{X}$,
How many orbitals occupied with electrons are found in the last principal level in its atom ?

.....

.....

Exam model 3

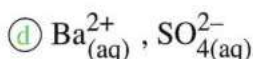
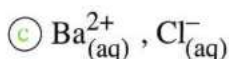
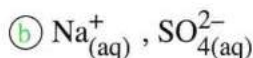
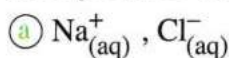


for general stream students

Choose the correct answer for the questions 1 : 20



The spectator ions are



- 2 X L of the gaseous element (A) combine with 2X L of hydrogen gas (at STP) to yield 2X L of the element (A) hydride.

What is the formula of element (A) hydride ?

- (a) HA (b) HA₂ (c) H₂A (d) H₂A₂

- 3 The key to understand the atomic structure is

- (a) the dual nature of the electron. (b) Rutherford's experiment.
(c) the line spectrum. (d) the negative electron charge.

- 4 The ratio between the energies of the two principal levels $\frac{L}{M}$ in the atom

- (a) is less than 1
(b) is higher than 1
(c) equals the ratio between the energies of $\frac{M}{N}$
(d) equals 1

- 5 Heisenberg's uncertainty principle depends on

- (a) the nucleus charge. (b) the electron charge.
(c) quantum mechanics. (d) the nucleus mass.

- 6 The presence of more than one spectral line in Bohr's experiment evidenced

- (a) the presence of more than one electron in the atom.
(b) the presence of more than one energy level.
(c) the positive charge of the nucleus.
(d) the revolution of the electrons around the nucleus.

- 7 The number of electrons which saturate any sublevel is estimated by the rule

- (a) $2(2l + 1)$ (b) $n + l$ (c) $2n^2$ (d) $2l$

- 8 The electron configuration of element (X) ends with $ns^1, (n-1)d^5$ and its electrons are distributed in 5 principal levels, its atomic number is

- (a) 24 (b) 29 (c) 42 (d) 47

- 9 The number of electrons which have the quantum number ($n = 3$) in iron (${}_{26}\text{Fe}$) atom is

- (a) 2 (b) 6 (c) 14 (d) 18

- 10 From the equation : $2\text{KClO}_{3(s)} \longrightarrow 2\text{KCl}_{(s)} + 3\text{O}_{2(g)}$

How many KClO₃ moles are required to produce 144 L of O₂ gas (at rtp) ?

- (a) 2 mol (b) 3 mol (c) 4 mol (d) 6 mol

11 The four quantum numbers of the last electron of an element atom are :

$(n = 1, \ell = 0, m_\ell = 0, m_s = -\frac{1}{2})$, this element is

- (a) representative nonmetal. (b) representative metal.
(c) located in group (2A). (d) noble gas.

12 The correct equation which may represent the electron affinity of an element located in column (18) in the periodic table is

- (a) $M_{(g)} + e^- \longrightarrow M_{(g)}^- + E$ (b) $M_{(g)} + e^- + E \longrightarrow M^-$
(c) $M_{(g)} + E \longrightarrow M^+ + e^-$ (d) $M_{(g)} \longrightarrow M^- + e^- + E$

13 Which of the following represents the reaction : $2KO_2 + 2HCl \longrightarrow 2KCl + H_2O_2 + O_2$?

Choices	Type of reaction	The change in oxygen
(a)	Comproportionation reaction	Oxidation and reduction
(b)	Disproportionation reaction	Oxidation and reduction
(c)	Comproportionation reaction	Oxidation only
(d)	Disproportionation reaction	Reduction only

14 What is the volume of 18 M sulphuric acid used to prepare 2.3 L of 0.145 M sulphuric acid ?

- (a) 0.33 mL (b) 2.9 mL (c) 6 mL (d) 18.53 mL

15 The two elements whose ions are (A^{2+}) and (B^{2-}) lie in the same period.

Which of the following shows the relation between the electronegativity of these two elements ?

- (a) $(B) < (A)$. (b) $(B) > (A)$. (c) $(B) \leq (A)$. (d) $(B) \geq (A)$.

16 The electron configuration of manganese ion in MnO_2 ends with [Mn = 25]

- (a) $3d^5$ (b) $2p^6$ (c) $3d^3$ (d) $3p^4$

17 The element which the electron configuration of its outer levels is $(6s^2, 5d^6, 4f^{14})$ is

- (a) an inner transition element. (b) a main transition element.
(c) a noble gas. (d) a representative s-block element.

- 18 The table below shows the ionization potentials of the element (X) :

Ionization potential order	First	Second	Third	Fourth	Fifth
Ionization potential (kJ/mol)	+738	+1450	+7733	+10543	+13630

The number of the valence electrons of the element (X) is

- (a) $1e^-$ (b) $2e^-$ (c) $3e^-$ (d) $4e^-$

- 19 The two elements (X) and (Y) lie in the same period, their atomic radii are (X) = 15.7 pm and (Y) = 104 pm, when these elements combine together,

- (a) (X) is oxidized, while (Y) is reduced. (b) both of them are reduced.
(c) (X) is reduced, while (Y) is oxidized. (d) both of them are oxidized.

- 20 Assisted by the opposite table : Arrange the elements according to the electronegativity

- (a) (C) < (D) < (B) < (A).
(b) (D) < (A) < (C) < (B).
(c) (A) < (B) < (C) < (D).
(d) (D) < (A) < (B) < (C).

Atom or ion	Electron configuration
A^{1-}	$[_{10}Ne]$
B^{2-}	$[_{10}Ne]$
C	$[_{18}Ar], 4s^1$
D	$[_{10}Ne], 3s^1$

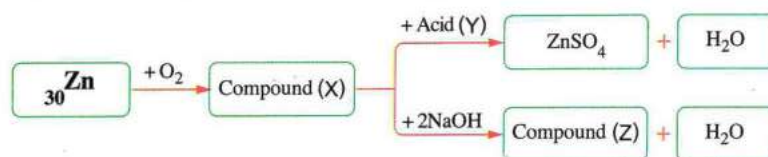
Answer the essay questions 21 , 22

- 21 1.5 g sample of a hydrocarbon burns in excess of oxygen gas yielding 4.4 g of CO_2 gas and 2.7 g of H_2O

Calculate the empirical formula of this hydrocarbon.

[C = 12 , H = 1 , O = 16]

- 22 Study the diagram below, then answer the questions :



(1) Write the chemical formula of compound (Z).

(2) Does the acid (Y) act generally as an oxidizing agent or a reducing agent ? Explain.

Choose the correct answer for the questions 1 : 20

1 Bohr agreed with Thomson's postulate, which is

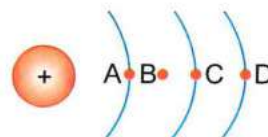
- (a) the electrons revolve in the energy levels.
- (b) most of the atom is space.
- (c) the atom is electrically neutral.
- (d) the electrons are embedded in the atom.

2 If an electron acquires energy equals 10.2 eV to move from the level (K) to the level (L), so to move from the level (M) to the level (L),

- (a) it loses energy equals 1.89 eV
- (b) it gains energy equals 1.89 eV
- (c) it loses energy equals 10.2 eV
- (d) it gains energy equals 10.2 eV

3 The opposite figure shows the probabilities of finding the electron in the atom.

The most accurate choice is



- (a) (B), (C) and (D) are consistent with Bohr's model.
- (b) (A), (C) and (D) are consistent with the modern atomic theory.
- (c) (B), (C) and (D) are consistent with the modern atomic theory.
- (d) (A), (B) and (C) are consistent with Bohr's model.

4 Which of the following statements is a Heisenberg's modification on Bohr's model ?

- (a) It is impossible to determine the location and the velocity of an electron around the nucleus precisely.
- (b) The regions of space between the energy levels are forbidden for the electrons.
- (c) The electron is a material particle that has wave properties.
- (d) Both the location and the velocity of the electron can be determined precisely.

5 How many moles of atoms are found in 30 g of glucose $C_6H_{12}O_6$? [C = 12, H = 1, O = 16]

- (a) 4
- (b) $\frac{1}{6}$
- (c) $\frac{1}{6} \times \text{Avogadro's number}$.
- (d) $4 \times \text{Avogadro's number}$.

6 How many electrons in the last principal level of chlorine atom $_{17}\text{Cl}$ do have magnetic quantum number zero ?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

- 7 How many electrons are found in the penultimate principal level of the element whose atomic number is 28 ?
 (a) 2 (b) 16 (c) 8 (d) 14
- 8 Three elements (A, B and C) lie in the same period in 3 consecutive groups, element (A) lies in the beginning of the 3rd period, hence the electron configuration of element (C) ends with
 (a) $4s^1$ (b) $3p^3$ (c) $3s^1$ (d) $3p^1$
- 9 Which of the following sets of quantum numbers describes the last electron in a representative element atom ?
 (a) $n = 3, \ell = 2, m_\ell = 0, m_s = -\frac{1}{2}$ (b) $n = 1, \ell = 0, m_\ell = 0, m_s = -\frac{1}{2}$
 (c) $n = 4, \ell = 3, m_\ell = -1, m_s = -\frac{1}{2}$ (d) $n = 3, \ell = 1, m_\ell = 0, m_s = -\frac{1}{2}$
- 10 The electrons of the representative element (X) are distributed in 4 principal energy levels, and two of its orbitals are half filled with electrons, element (X) lies
 (a) in the 4th period, group 2A (b) in the 4th period, group 5A
 (c) in the 4th period, group 6A (d) in the 3rd period, group 6A
- 11 The table shows the atomic radii of 4 elements located in the same period in the periodic table.
 The element with the highest atomic number is
 (a) (X). (b) (Y).
 (c) (W). (d) (Z).
- | Element | Atomic radius |
|---------|---------------|
| (W) | 135 pm |
| (X) | 118 pm |
| (Y) | 227 pm |
| (Z) | 114 pm |
- 12 The table below shows the ionization potentials of element (X) found in 3rd period :
- | Ionization potential order | 1 st | 2 nd | 3 rd | 4 th | 5 th | 6 th |
|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Ionization potential (kJ/mol) | +1060 | +1890 | +2905 | +4750 | +6270 | +21200 |
- The atomic number of element (X) is
 (a) 7 (b) 15 (c) 16 (d) 18
- 13 The most reactive metals are the elements
 (a) of group 7A
 (b) whose electron configurations end with ns^1
 (c) of the first period.
 (d) whose electron configurations end with ns^2

14 In the same period from the left to the right, each of the following decreases, except

- (a) the atomic radius. (b) the basicity.
(c) the metallic property. (d) the electronegativity.

15 According to the reaction : $2\text{SO}_{3(g)} \longrightarrow 2\text{SO}_{2(g)} + \text{O}_{2(g)}$

What is the total volume of the gases produced from the decomposition of 0.1 L of sulphur trioxide gas? (All volumes are measured at rtp).

- (a) 0.2 L (b) 0.15 L (c) 0.1 L (d) 0.05 L

16 According to the electron configuration of element (X) : $[\text{Ne}] , 3s^2 , 3p^1$, all the following are correct, except

- (a) its oxide is amphoteric, and its ionization potential is less than that of the preceding element in the same period.
(b) the value of its electron affinity indicates released energy.
(c) its oxide is amphoteric, and its atomic size is larger than that of the following element in the same period.
(d) its ionization energy is higher than that of the following element in the same period.

17 Which of the following represents the compound KClO_4 ?

Choices	It acts as	Oxidation number of Cl
(a)	Reducing agent	+7
(b)	Reducing agent	-7
(c)	Oxidizing agent	+7
(d)	Oxidizing agent	-7

18 Which of the following equations represents the electron affinity of beryllium ?

- (a) $\text{Be}_{(g)} + e^- \longrightarrow \text{Be}_{(g)}^- , \Delta H = (-)$ (b) $\text{Be}_{(g)} + e^- \longrightarrow \text{Be}_{(g)}^- , \Delta H = (+)$
(c) $\text{Be}_{(g)} \longrightarrow \text{Be}_{(g)}^+ , \Delta H = (-)$ (d) $\text{Be}_{(g)} \longrightarrow \text{Be}_{(g)}^+ , \Delta H = (+)$

19 Regarding the elements $_{19}\text{X}$ and $_{17}\text{Y}$, Which of the following is correct ?

- (a) Reduction of element (X) is easier than the reduction of (Y).
(b) Oxidation of element (Y) is easier than the oxidation of (X).
(c) Upon combination, they are neither oxidized nor reduced.
(d) Oxidation of element (X) is easier than that of (Y).

20 In the reaction : $2\text{FeCl}_{3(aq)} + \text{H}_2\text{S}_{(aq)} \longrightarrow 2\text{HCl}_{(aq)} + 2\text{FeCl}_{2(aq)} + \text{S}_{(s)}$

Which of the following is correct ?

- (a) S is reduced. (b) Iron is oxidized.
(c) H_2S is oxidizing agent. (d) FeCl_3 is oxidizing agent.

Answer the essay questions 21 : 23

21 Deduce the atomic number of the element whose electrons are distributed in 4 principal energy levels, 6 of its orbitals are half filled, with showing its electron configuration.

22 In the reaction : $2\text{SO}_{2(g)} + \text{O}_{2(g)} \xrightarrow{\Delta} 2\text{SO}_{3(g)}$

What is the limiting reactant of the reaction when 1.5 mol of O_2 react with 2.5 mol of SO_2 ?

23 A solution, its volume is 1500 mL, contains 0.06 mol of NaHCO_3 :

(1) Calculate the number of bicarbonate ions in this solution.

(2) Calculate the volume of water required to be added to this solution, so as the concentration to become 0.01 M

Exam model 5



for general stream students

Choose the correct answer for the questions 1 : 20

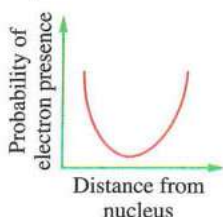
1 Which of the following postulates represents Rutherford's model but not Thomson's ?

- (a) The atom is a homogeneous sphere of positive charges.
(b) The atom contains negative charges.
(c) The atom contains positively charged nucleus.
(d) The atom is electrically neutral.

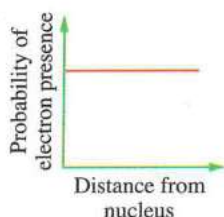
2 Obtaining the visible spectrum of an excited electron in the level (M) in hydrogen atom requires that

- (a) the electron loses a quantum of energy less than that it acquired.
- (b) the electron loses a quantum of energy equals that it acquired.
- (c) the electron gains a quantum of energy.
- (d) the electron loses a quantum of energy greater than that it acquired.

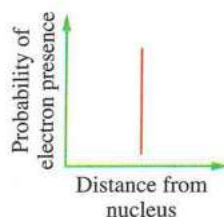
3 Which of the following graphs represents the relation between the probability of the presence of an electron and the distance from the nucleus according to Bohr ?



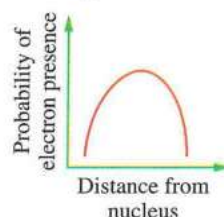
(a)



(b)



(c)



(d)

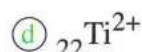
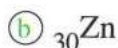
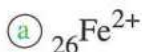
4 A modification that Heisenberg introduced to Bohr's model is that

- (a) both the position and the speed of an electron can be determined precisely.
- (b) the electron is a particle having a mass and wave properties.
- (c) if the speed of the electron can be determined, it is impossible to locate it accurately at the same time.
- (d) it is possible for the electron to be found in the regions between the orbits.

5 After applying the wave equation to the last electron in sodium atom $_{11}\text{Na}$, it was concluded that

- (a) it has a constant distance from the nucleus in the level M
- (b) it moves closer and farther from the nucleus in the level M
- (c) its energy is lower than that of the electrons in the level L
- (d) it moves to the level L after gaining a quantum of energy.

6 The number of the electrons which have the spin quantum number $(+\frac{1}{2})$ equals that which have the spin quantum number $(-\frac{1}{2})$ in



7 The electrons of the atom of element (X) are distributed in 3 principal energy levels, and the last sublevel contains the highest number of the unpaired electrons. What is the atomic number of (X) ?

(a) 14

(b) 15

(c) 16

(d) 17

8 The shown electron configuration is

- (a) compatible with Hund's rule and Pauli's principle.
- (b) compatible with Pauli's principle, but not with Hund's rule.
- (c) incompatible with Hund's rule and Pauli's principle.
- (d) compatible with Hund's rule and Aufbau principle.



9 Which of the following is the electron configuration of carbon atom ${}_6\text{C}$ in its excited state ?

- (a) $[\text{He}], 3s^2, 3p^2$
- (b) $[\text{He}], 2s^1, 2p^3$
- (c) $[\text{He}], 2s^2, 2p^3$
- (d) $[\text{He}], 2s^2, 2p^1$

10 Regarding an element that lies in the second period, group 5A

Which of the following represents this element ?

- (a) The number of its unpaired electrons is 5
- (b) A representative element whose electron configuration ends with $2p^5$
- (c) The number of its unpaired electrons is 3
- (d) A noble gas its atomic number is 10

11 The electron configuration of element (X) ends with $ns^1, (n-1)d^5$, and its electrons are distributed in 5 principal levels, its atomic number is

- (a) 24
- (b) 29
- (c) 42
- (d) 47

12 Which of the following is the order of the elements ${}_{37}\text{X}$, ${}_{12}\text{Y}$, ${}_4\text{Z}$, and ${}_{19}\text{M}$ according to the atomic radius ?

- (a) $(\text{M}) > (\text{X}) > (\text{Y}) > (\text{Z})$.
- (b) $(\text{X}) > (\text{M}) > (\text{Z}) > (\text{Y})$.
- (c) $(\text{Z}) > (\text{Y}) > (\text{M}) > (\text{X})$.
- (d) $(\text{X}) > (\text{M}) > (\text{Y}) > (\text{Z})$.

13 The compound MCl_3 contains 20.22% of element M

What is the gram atomic (molar) mass of element M ?

[Cl = 35.5]

- (a) 27 g/mol
- (b) 48 g/mol
- (c) 56 g/mol
- (d) 127 g/mol

14 Which of the following describes the electron affinity of the element of the periodic table ?

- (a) It decreases in the same period with increasing the atomic number.
- (b) It can be gained or released energy.
- (c) It increases in the same group with increasing the atomic number.
- (d) It is released energy only.

15 The equation which represents the third ionization potential of aluminum is

- ☐ a $\text{Al}_{(g)} \longrightarrow \text{Al}_{(g)}^{3+} + 3e^{-}, \Delta H = (+)$
☐ b $\text{Al}_{(g)}^{2+} \longrightarrow \text{Al}_{(g)}^{3+} + e^{-}, \Delta H = (-)$
☐ c $\text{Al}_{(g)}^{+} \longrightarrow \text{Al}_{(g)}^{3+} + 2e^{-}, \Delta H = (+)$
☐ d $\text{Al}_{(g)}^{2+} \longrightarrow \text{Al}_{(g)}^{3+} + e^{-}, \Delta H = (+)$

16 The table below shows the ionization potentials of element (X) found in 2nd period :

Ionization potential order	1 st	2 nd	3 rd	4 th	5 th	6 th
Ionization potential (kJ/mol)	+1060	+1890	+2905	+4950	+6270	+21200

Which of the following represents the electron affinity of this element ?

- ☐ a Negative absorbed energy.
 ☐ b Positive absorbed energy.
☐ c Negative released energy.
 ☐ d Positive released energy.

17 Sodium hydroxide solution its volume is 1 L and its concentration is 1 M, an amount of water is added to it, its volume is double the volume of the solution, the number of moles in the solution after the dilution equals

- ☐ a $\frac{1}{3}$ mol
 ☐ b $\frac{1}{2}$ mol
 ☐ c 1 mol
 ☐ d 2 mol

18 Which of the following is correct ?

Choices	Basic oxide	Neutral oxide	Acidic oxide
☐ a	CaO	CO ₂	CO
☐ b	Al ₂ O ₃	CO	CO ₂
☐ c	Al ₂ O ₃	CO ₂	CO
☐ d	CaO	CO	CO ₂

19 Which of the following does not represent SnO ?

- ☐ a It can react with the product of dissolving SO_{3(g)} in water.
☐ b The atom of its cation is a metalloid.
☐ c It can react with the product of dissolving K₂O_(s) in water.
☐ d The oxidation number of Sn is +2

20 In which of the following changes does vanadium undergo oxidation ?

- ☐ a $\text{VO}_2 \longrightarrow \text{V}_2\text{O}_3$
☐ b $\text{V}_2\text{O}_5 \longrightarrow \text{VO}_2$
☐ c $\text{V}_2\text{O}_3 \longrightarrow \text{VO}$
☐ d $\text{V}_2\text{O}_3 \longrightarrow \text{V}_2\text{O}_5$

Answer the essay questions 21 , 22

21 From the balanced equation :



- (1) Write the oxidation and the reduction equations.
 (2) Balance the ionic equation of the reaction.

22 By knowing the molecular formula of methane CH_4 , Calculate :

[C = 12 , H = 1]

- (1) The mass of one molecule of it in grams.
 (2) The volume of 8 g of it (at rtp).

Exam model 6



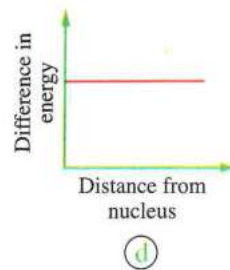
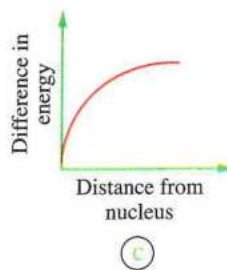
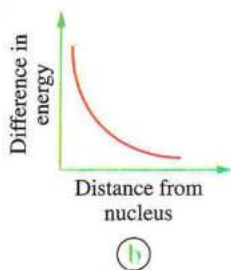
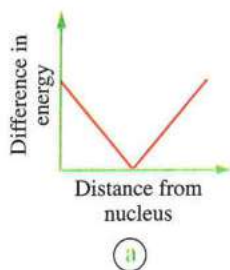
for general stream students

Choose the correct answer for the questions 1 : 20

1 What is the number of hydrogen atoms in 2 mol of ammonia gas ?

- (a) 6.02×10^{23} atoms. (b) 12.04×10^{23} atoms.
 (c) 18.06×10^{23} atoms. (d) 36.12×10^{23} atoms.

2 Which graph does represent the relation between the difference in energy between two consecutive levels and the distance from the nucleus ?



3 In the reaction : $2\text{K}_2\text{S}_2\text{O}_3 + \text{I}_2 \longrightarrow \text{K}_2\text{S}_4\text{O}_6 + 2\text{KI}$

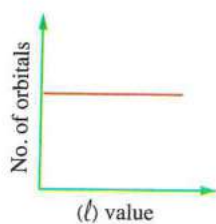
Each of the following is correct, except that

- (a) sulphur is oxidized.
 (b) $\text{K}_2\text{S}_2\text{O}_3$ is a reducing agent.
 (c) the oxidation number of oxygen remains constant.
 (d) the oxidation number of iodine remains constant.

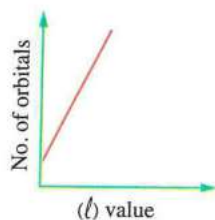
4 The following are valid postulates (advantages) of Bohr's atomic model, except

- (a) it identified the orbits in which the electrons revolve.
- (b) it explained the line spectrum of hydrogen atom.
- (c) it presumed the possibility of determining the speed and the location of an electron.
- (d) it introduced the quantum concept to determine the energy of an electron.

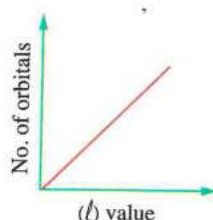
5 Which graph does represent the relation between (l) value and the number of orbitals of the sublevel ?



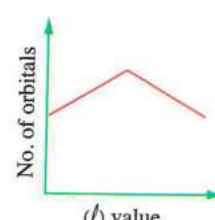
(a)



(b)



(c)



(d)

6 The principal quantum number of the farthest electron from the nucleus in nickel ^{28}Ni atom is

- (a) 2
- (b) 3
- (c) 4
- (d) 5

7 Which of the electrons which have the following quantum numbers has the highest energy ?

The electron Quantum number	(A)	(B)	(C)	(D)
n	5	4	4	5
l	0	1	2	2
m_l	0	0	-1	+1
m_s	$+\frac{1}{2}$	$-\frac{1}{2}$	$+\frac{1}{2}$	$+\frac{1}{2}$

- (a) (A).
- (b) (B).
- (c) (C).
- (d) (D).

8 According to the reaction :



What is the volume of hydrazine gas (at STP) produced from the reaction of an amount of ammonia gas containing 12 g of hydrogen ?

[N = 14, H = 1]

- (a) 15.8 L
- (b) 7.9 L
- (c) 22.4 L
- (d) 44.8 L

9 Which of the following sets describes the 19th electron in chromium $_{24}\text{Cr}$ atom ?

(a) $n = 3, \ell = 0, m_\ell = 0, m_s = +\frac{1}{2}$

(b) $n = 3, \ell = 2, m_\ell = -2, m_s = +\frac{1}{2}$

(c) $n = 4, \ell = 0, m_\ell = 0, m_s = +\frac{1}{2}$

(d) $n = 4, \ell = 1, m_\ell = -1, m_s = +\frac{1}{2}$

10 The orbitals (p_x, p_y) in the fourth principal level are similar in all the following, except

(a) the size.

(b) the energy.

(c) the electron capacity.

(d) the spatial orientation.

11 What is the type of the element whose atom contains 2 electrons in the sublevel whose (ℓ) is 2 ?

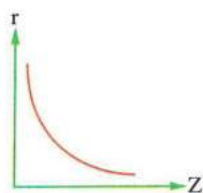
(a) Representative.

(b) Main transition.

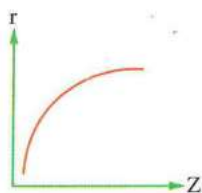
(c) Noble.

(d) Inner transition.

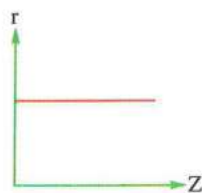
12 Which graph does represent the relation between the atomic radius (r) and the atomic number (Z) in the same period in the modern periodic table ?



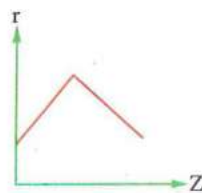
(a)



(b)



(c)



(d)

13 Which of the following is correct ?

Choices	Reactants	Net ionic equation
(a)	H_2SO_4 and K_2CO_3	$2\text{K}^+_{(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})} \longrightarrow \text{K}_2\text{SO}_{4(\text{aq})}$
(b)	H_2SO_4 and K_2CO_3	$\text{K}_2\text{CO}_{3(\text{aq})} + 2\text{H}^+_{(\text{aq})} \longrightarrow \text{CO}_{2(\text{g})} + \text{H}_2\text{O}_{(\text{l})} + 2\text{K}^+_{(\text{aq})}$
(c)	H_2SO_4 and KOH	$\text{OH}^-_{(\text{aq})} + \text{H}^+_{(\text{aq})} \longrightarrow \text{H}_2\text{O}_{(\text{l})}$
(d)	H_2SO_4 and KOH	$2\text{KOH}_{(\text{s})} + 2\text{H}^+_{(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})} \longrightarrow 2\text{H}_2\text{O}_{(\text{l})} + \text{K}_2\text{SO}_{4(\text{aq})}$

14 Which of the following elements has the highest metallic property ?

(a) $_{16}\text{S}$

(b) $_{14}\text{Si}$

(c) $_{13}\text{Al}$

(d) $_{20}\text{Ca}$

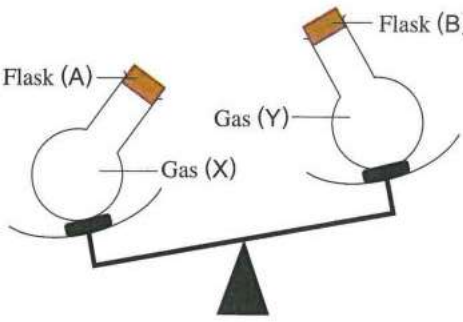
- 15 The combustion of 2.2 g of compound (X) yields 4.4 g of CO_2 and 1.8 g of H_2O . What is the empirical formula of the compound (X)? [C = 12, H = 1, O = 16]
- (a) CHO (b) $\text{C}_2\text{H}_4\text{O}$ (c) CH_2O (d) $\text{C}_2\text{H}_3\text{O}_4$
- 16 Which of the following equations represents the second ionization potential of calcium?
- (a) $\text{Ca}_{(\text{g})} + \text{Energy} \longrightarrow \text{Ca}_{(\text{g})}^+ + \text{e}^-$ (b) $\text{Ca}_{(\text{g})}^+ + \text{Energy} \longrightarrow \text{Ca}_{(\text{g})}^{2+} + \text{e}^-$
- (c) $\text{Ca}_{(\text{g})}^- + \text{e}^- \longrightarrow \text{Ca}_{(\text{g})}^{2-} + \text{Energy}$ (d) $\text{Ca}_{(\text{g})}^+ + \text{e}^- \longrightarrow \text{Ca}_{(\text{g})} + \text{Energy}$
- 17 The property which decreases in the second period on moving from lithium to fluorine is
- (a) the atomic size. (b) the electronegativity.
- (c) the nuclear charge. (d) the ionization potential.
- 18 When two equal volumes of 0.1 M AgNO_3 and 0.2 M NaCl solutions are mixed together, the concentration of nitrate ions in the mixture will be
- (a) 0.05 M (b) 0.1 M (c) 0.15 M (d) 0.2 M
- 19 Why does aluminum oxide disappear when a little amount of it is added to sodium hydroxide solution with stirring?
- (a) Because aluminum $_{13}\text{Al}$ lies in the same period of sodium $_{11}\text{Na}$
- (b) Because aluminum oxide reacts as a base with sodium hydroxide.
- (c) Because the basicity increases along the same period with increasing the atomic number.
- (d) Because aluminum oxide reacts as an acid with sodium hydroxide.
- 20 What is the oxidation number of nitrogen in hydrazine?
- (a) +2 (b) +3 (c) -3 (d) -2

Answer the essay questions 21, 22

- 21 Identify the block, the type and the location of $_{25}\text{Mn}$ element in the periodic table.
-

- 22 Calculate the mass of methane gas CH_4 which has the same volume of 8 g of oxygen gas O_2 (at rtp). [C = 12, H = 1, O = 16]
-

Choose the correct answer for the questions 1 : 20

- 1 The elements (A), (B) and (C) lie in the same period in 3 consecutive groups, the element (C) is a noble gas, hence the symbol of the ion of (A) is
 (a) A^+ (b) A^- (c) A^{2-} (d) A^{2+}
- 2 How many moles of cations are found in 1000 mL of potassium sulphate solution its concentration is 0.2 M ?
 (a) 1 mol (b) 0.1 mol (c) 0.2 mol (d) 0.4 mol
- 3 The following substances can act as reducing agents, except
 (a) HNO_3 (b) NH_3 (c) H_2 (d) KI
- 4 Which of the following is the electron configuration of the element whose electron affinity is the highest released energy ?
 (a) $[Ne], 3s^2, 3p^2$ (b) $[Ne], 3s^2, 3p^5$
 (c) $[Ne], 3s^2, 3p^4$ (d) $[Ne], 3s^2, 3p^6, 3d^5, 4s^1$
- 5 How many electrons do have the two quantum numbers ($n = 3$), ($l = 2$) in iron atom ?
 (a) 8 (b) 6 (c) 4 (d) 2 [Fe = 26]
- 6 The figure shows 2 similar flasks (A) and (B) filled with the gases (X) and (Y) at room temperature and normal pressure, placed on two pans of a balance. Which of the following is correct ?

 (a) Number of (X) molecules is higher than number of (Y) molecules.
 (b) Number of (X) moles is higher than number of (Y) moles.
 (c) The molar mass of (X) is larger than the molar mass of (Y).
 (d) The molar volume of (X) is larger than the molar volume of (Y).
- 7 On moving in group (1A) from lithium to rubidium,
 (a) the atomic radius decreases. (b) the ionic radius increases.
 (c) the first ionization potential increases. (d) the electronegativity increases.

- 8 Which of the following is similar in the atomic models of Thomson and Rutherford ?
- (a) The electron movement. (b) The homogeneity of the atom mass.
(c) The atom is electrically neutral. (d) The homogeneity of the positive charge.

- 9 What is the type of the elements which the electron configuration of their outermost energy level is $(ns^{1:2}, np^{1:5})$?
- (a) Main transition elements. (b) Representative elements.
(c) Inner transition elements. (d) Noble elements.

- 10 1.36 g of $XCl_{2(aq)}$ react completely with 20 mL of 0.5 M sodium hydroxide solution, to form $X(OH)_2$
What is the gram atomic mass of element (X) ?

(a) 272 (b) 201 (c) 136 (d) 65

- 11 The last energy level in the atom of element (X) ($n = 3$) is occupied by 6 electrons, the oxide of this element is
- (a) neutral. (b) basic. (c) acidic. (d) amphoteric.

- 12 This table presents the ionization potentials of the element (X) :

Ionization potential	First	Second	Third	Fourth	Fifth	Sixth	Seventh
Value (kJ/mol)	+999	+2252	+3357	+4556	+7004	+8496	+27108

It is concluded from this table that

- (a) the last sublevel p in (X) atom is half filled with electrons.
(b) (X) forms with beryllium a compound its formula is BeX_2
(c) (X) lies in group 7A in the periodic table.
(d) the first ionization potential of (X) is less than that of the element preceding it.

- 13 Which of the following combinations of quantum numbers includes a mistake ?

(a) $n = 4, \ell = 0, m_\ell = 0, m_s = -\frac{1}{2}$ (b) $n = 3, \ell = 2, m_\ell = -2, m_s = +\frac{1}{2}$
(c) $n = 5, \ell = 3, m_\ell = 0, m_s = -\frac{1}{2}$ (d) $n = 3, \ell = 2, m_\ell = -3, m_s = +\frac{1}{2}$

- 14 This equation represents the overall reaction in nickel-cadmium battery :



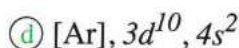
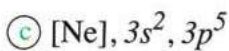
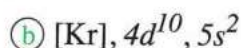
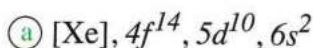
Which of the following shows the change in the oxidation number of nickel ?

(a) $+3 \longrightarrow +2$ (b) $+3 \longrightarrow +4$ (c) $+2 \longrightarrow +3$ (d) $+1.5 \longrightarrow +2$

15 Which of the following electron configurations violates Hund's rule ?



16 The choices below shows the electron configurations of different elements in the same block in the periodic table, except



17 For an electron to move from the first level K to the fourth level N, it requires

(a) gaining a quantum of energy.

(b) losing a quantum of energy.

(c) gaining 4 quanta of energy.

(d) losing 4 quanta of energy.

18 The electrons of the atom of a representative elements are distributed in 4 principal levels, the outermost energy level contains 3 unpaired electrons, the atomic number of the element is

(a) 30

(b) 31

(c) 32

(d) 33

19 How many half filled orbitals are found in the atom of the element whose atomic number is 24 ?

(a) 4

(b) 5

(c) 6

(d) 2

20 The combustion of a hydrocarbon yields 3.6 g of H_2O

What is the mass of hydrogen in this hydrocarbon ?

[H = 1, O = 16]

(a) 0.2 g

(b) 0.4 g

(c) 0.6 g

(d) 0.8 g

Answer the essay questions 21, 22

21 If the last electron in an atom of an element has the quantum numbers :

$$(n = 3, \ell = 1, m_\ell = -1, m_s = -\frac{1}{2})$$

Identify the location of this element in the periodic table.

22 Balance the following equation, with identifying the reducing agent :





Choose the correct answer for the questions 1 : 20

1 Which of the following is a redox reaction ?

- (a) $2\text{K}_2\text{CrO}_4 + \text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{Cr}_2\text{O}_7 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$
- (b) $\text{Cu}(\text{OH})_{2(s)} \longrightarrow \text{CuO}_{(s)} + \text{H}_2\text{O}_{(v)}$
- (c) $2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl}$
- (d) $\text{BaSO}_3 + 2\text{HCl} \longrightarrow \text{BaCl}_2 + \text{H}_2\text{O} + \text{SO}_2$

2 Thomson presumed that carbon atom

- (a) contains a nucleus.
- (b) contains positively charged electrons.
- (c) does not contain any space.
- (d) contains negative electrons revolving in definite orbits.

3 An amount of magnesium chloride contains 6.02×10^{23} molecules, is dissolved in water yielding 1000 mL solution of magnesium chloride.

What is the concentration of the anions in this solution ?

- (a) 2 mol/L (b) 1 mol/L (c) 0.5 mol/L (d) 0.25 mol/L

4 The probability of the presence of an electron around the nucleus is represented by

- (a) the emission spectrum and the orbital. (b) the quantum and the emission spectrum.
- (c) the orbital and the electron cloud. (d) the quantum and the electron cloud.

5 Which of the following transitions of the excited hydrogen electron is accompanied by releasing the largest amount of energy ?

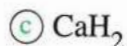
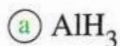
- (a) $n = 1 \longrightarrow n = 2$ (b) $n = 3 \longrightarrow n = 2$
- (c) $n = 5 \longrightarrow n = 4$ (d) $n = 2 \longrightarrow n = 1$

6 Which of the following is saturated by the least number of electrons ?

- (a) Sublevel 3d (b) Sublevel 2p
- (c) Principal level $n = 2$ (d) An orbital of sublevel 4f

- 7** If two electrons have the same four quantum numbers, this means that these electrons are found in
- (a) two different elements atoms. (b) the same principal level.
(c) the same sublevel. (d) the same orbital.
- 8** The properties of the element whose atomic number is 5 are similar to those of the element whose atomic number is
- (a) 19 (b) 13 (c) 15 (d) 8
- 9** Bohr's atomic model was different from Rutherford's atomic model, this is manifested in Bohr's postulate that the electron
- (a) is a negatively charged material particle.
(b) has a line spectrum that appears on losing a quantum of energy.
(c) revolves around the nucleus in definite orbits.
(d) does not have a line spectrum which would appear by losing a quantum of energy.
- 10** The visible line spectrum of hydrogen atom is composed of 4 coloured lines. Which of them has the lowest frequency ?
- (a) The green line. (b) The red line.
(c) The blue line. (d) The violet line.
- 11** The electron configuration of copper ion in CuSO_4 is [$_{29}\text{Cu}$]
- (a) $[\text{Ar}], 4s^2, 4d^9$ (b) $[\text{Ar}], 4s^1, 3d^{10}$
(c) $[\text{Ar}], 4s^0, 3d^8$ (d) $[\text{Ar}], 4s^0, 3d^9$
- 12** The element whose electron configuration : $[\text{Xe}], 6s^2, 5d^3, 4f^{14}$ is
- (a) an inner transition element. (b) a main transition element.
(c) a noble element. (d) a representative element.
- 13** The number of the unpaired electrons in the sublevel $3d$ in an atom of element (X) equals the number of the electrons in the sublevel $1s$
What is the atomic number of this element?
- (a) 18 (b) 20 (c) 28 (d) 24
- 14** Oxygen constitutes 20% of the atmospheric air.
What is the volume of air (at STP) required to burn 150 cm^3 of carbon monoxide gas ?
- (a) 75 cm^3 (b) 250 cm^3 (c) 375 cm^3 (d) 500 cm^3

15 The oxidation number of hydrogen is (-1) in all the following compounds, except



16 According to the data below:

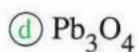
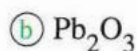
– Test tube mass = 21.28 g

– Test tube mass + Lead oxide = 32.43 g

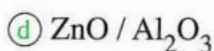
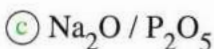
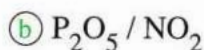
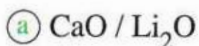
– Test tube mass + Lead = 31.63 g

What is the empirical formula of lead oxide ?

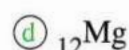
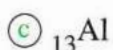
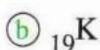
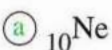
[Pb = 207, O = 16]



17 Which two of the following compounds react together when being dissolved in water ?



18 The difference between the first and the second ionization potentials is great in the atom of



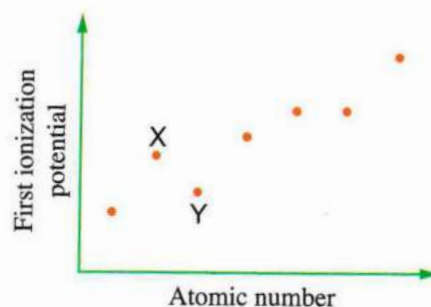
19 The chart represents the first ionization potentials of various elements in the same period, the ionization potential of element (X) is higher than that of element (Y), as element (Y)

(a) loses its electron from different energy sublevel.

(b) has a smaller atomic radius.

(c) has a stable electron configuration.

(d) has a higher effective nuclear charge.



20 The principal energy level ($n = 4$), which is the last in the atom of a representative element, contains 3 electrons, hence the atomic number of this element is



Answer the essay questions 21 , 22

- 21 Identify the four quantum numbers of the last electron, with the highest energy, in the atom of lanthanum element $_{57}\text{La}$, then determine its location in the periodic table.

- 22 Iodine element forms the acids : (HIO , HIO_2 , HIO_3 , HIO_4) Which of these acids acts always as an oxidizing agent ? Explain.

Exam model 9



for general stream students

Choose the correct answer for the questions 1 : 20

- 1 The element whose electron configuration ends with $4s^1$, $3d^5$ lies in group
- (a) 3A (b) 7B (c) 7A (d) 6B
- 2 Which of the following is the number of moles of the atoms found in 0.5 mol of citric acid $\text{C}_6\text{H}_8\text{O}_7$?
- (a) 6.32×10^{24} (b) 1.806×10^{24} (c) 21 (d) 10.5
- 3 Which of the following is a redox reaction ?
- (a) $\text{H}_2 \longrightarrow 2\text{H}^+ + 2\text{e}^-$
- (b) $\text{Cl}_2 + 2\text{e}^- \longrightarrow 2\text{Cl}^-$
- (c) $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$
- (d) $\text{Mg}(\text{NO}_3)_2 + \text{Na}_2\text{CO}_3 \longrightarrow \text{MgCO}_3 + 2\text{NaNO}_3$
- 4 An element with the electron configuration : $[\text{Xe}], 6s^2, 4f^{14}, 5d^3$, this element is
- (a) a main transition element in the fourth period.
- (b) a main transition element in the sixth period.
- (c) an inner transition element of lanthanides.
- (d) an inner transition element of actinides.

- 5 The radius of sodium ion Na^+ equals 95 pm, hence the atomic radius of Na is
- (a) equal to 95 pm (b) less than 95 pm
(c) greater than 95 pm (d) equal to 95 pm or greater.
- 6 Each of an orbital in $3d$ sublevel and an orbital in $4s$ sublevel contains two paired electrons in
- (a) $_{26}\text{Fe}$ (b) $_{29}\text{Cu}$ (c) $_{28}\text{Ni}^{2+}$ (d) $_{21}\text{Sc}^{3+}$
- 7 If an atom of an element contains 3 principal levels, and the last sublevel contains $2e^-$ unpaired, then the atomic number of the element is
- (a) 14 only. (b) 15 only. (c) 16 only. (d) 14 or 16
- 8 The nucleus of manganese atom contains 25 protons, the number of the unpaired electrons in manganese in the compound MnSO_4 is
- (a) $5e^-$ (b) $6e^-$ (c) $4e^-$ (d) $1e^-$
- 9 After balancing the equation of the redox reaction : $\text{Cr}^{3+} + \text{Mg} \longrightarrow \text{Cr} + \text{Mg}^{2+}$
The summation of the coefficients equals
- (a) 10 (b) 6 (c) 5 (d) 4
- 10 The visible line spectrum of hydrogen results from the returning of the excited electron to
- (a) the first level. (b) the second level.
(c) the third level. (d) the fourth level.
- 11 According to Bohr's atomic model, as the distance from the nucleus increases, the region forbidden for the electrons
- (a) decreases. (b) increases.
(c) remains constant. (d) increases then decreases.
- 12 The electron configuration $[\text{Ar}], 3d^5$ belongs to the ion
- (a) $_{26}\text{Fe}^{3+}$ (b) $_{24}\text{Cr}^{2+}$ (c) $_{25}\text{Mn}^{3+}$ (d) $_{27}\text{Co}^{3+}$
- 13 The maximum value of the quantum number m_l of an electron that lies in the third principal level is
- (a) +2 (b) +3 (c) +1 (d) +4

- 14 In the sublevel which contains a number of electrons equals $(2l+1)$, the number of the paired electrons equals
- (a) zero (b) 3 (c) 5 (d) 7

- 15 Applying Pauli's principle to the last two electrons in the last sublevel in oxygen

${}_8\text{O}$ atom reveals that they are different in

- (a) the principal and the subsidiary quantum numbers.
 (b) the subsidiary and the magnetic quantum numbers.
 (c) the magnetic and the principal quantum numbers.
 (d) the spin and the magnetic quantum numbers.

- 16 Three elements have consecutive atomic numbers ($A \longrightarrow B \longrightarrow C$), element (B) does not form compounds at normal conditions, so

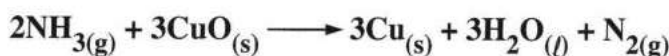
- (a) (A) is easily oxidized and acts as a reducing agent.
 (b) (C) is easily oxidized and acts as a reducing agent.
 (c) (B) is easily reduced and acts as an oxidizing agent.
 (d) (C) is easily reduced and acts as an oxidizing agent.

- 17 5.4 g of the compound whose molecular formula is Y_2O_5 contains 1.4 g of the element (Y). How many moles of (Y) are found in 1.4 g of it ?

[O = 16]

- (a) 0.2 mol (b) 0.3 mol (c) 0.03 mol (d) 0.0015 mol

- 18 In the reaction :



What is the volume of nitrogen gas (at rtp) produced from the reaction of 8.5 g of ammonia gas with an adequate amount of copper (II) oxide ?

[N = 14, H = 1]

- (a) 11.2 L (b) 12 L (c) 5.6 L (d) 6 L

- 19 In the reaction :



0.08 mol of nitric acid is added to 0.05 mol of calcium carbonate.

Which of the following is correct after the end of the reaction ?

- (a) 0.05 mol of CO_2 is produced. (b) 0.08 mol of $\text{Ca}(\text{NO}_3)_2$ is produced.
 (c) 0.04 mol of H_2O is produced. (d) 0.03 mol of HNO_3 remains unreacted.

- 20 This table shows the first ionization potential (in kJ/mol) of each of three elements that lie in the beginning of the third period.

Element	First ionization potential
(A)	496
(B)	738
(C)	578

What is the correct arrangement of these elements according to the metallic property?

- (a) $C > B > A$ (b) $C > A > B$
(c) $B > C > A$ (d) $A > C > B$

Answer the essay questions 21 , 22

- 21 The two opposite figures represent two different perceptions for the movement of the electrons around the nucleus :



Figure (X)



Figure (Y)

- (1) What is the name of the scientist who suggested the perception which is illustrated in figure (Y) ?

.....

- (2) What is the scientific term that represents the region in which the probability of the presence of the electron is the highest in the figure (X) ?

.....

- 22 A solution of CaCl_2 its volume is 250 mL and its concentration is 0.1 M :

- (1) Calculate the solute mass in this solution.

[Ca = 40 , Cl = 35.5]

.....

- (2) Calculate the concentration of this solution after the evaporation of 50 mL of water from it.

.....

- (3) What is the mass of the solute in the solution which remains after the evaporation of 50 mL ?

.....

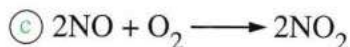
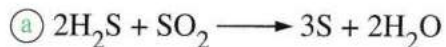
Exam model 10



for general stream students

Choose the correct answer for the questions 1 : 20

1 Which of the following reactions is a disproportionation reaction ?



2 The term (electron) was not known in the time of the model of

☐ (a) Schrödinger.

☐ (b) Rutherford.

☐ (c) Thomson.

☐ (d) Bohr.

3 Assuming that 23 g of sodium contain (X) atoms of sodium.

How many atoms are found in 32 g of oxygen gas ?

[Na = 23 , O = 16]

☐ (a) 0.5X

☐ (b) X

☐ (c) 1.5X

☐ (d) 2X

4 Rutherford proved experimentally, for the first time, that the atom

☐ (a) is indivisible.

☐ (b) is neutral.

☐ (c) contains vast space.

☐ (d) is solid.

5 The dual nature of the electron means that it has

☐ (a) both mass and charge.

☐ (b) both mass and wave properties.

☐ (c) both volume and density.

☐ (d) both mass and density.

6 The modern atomic theory agreed with Rutherford's atomic model that

☐ (a) the atom is not solid.

☐ (b) the electron has wave properties.

☐ (c) it is impossible to determine the position and the speed of an electron precisely.

☐ (d) the electrons revolve around the nucleus.
7 The maximum value of the quantum number m_l of an electron located in the 3rd principal level is
☐ (a) 0

☐ (b) +1

☐ (c) +2

☐ (d) +3

8 The orbitals of the same sublevel have

☐ (a) different energies.

☐ (b) the same energy.

☐ (c) different shapes.

☐ (d) different volumes.

- 9 Which of the following sets of quantum numbers describes an electron occupying the orbital $3p_x$?
- (a) $n = 3, \ell = 2, m_\ell = -1$ (b) $n = 3, \ell = 0, m_\ell = +1$
 (c) $n = 3, \ell = 0, m_\ell = 0$ (d) $n = 3, \ell = 1, m_\ell = -1$
- 10 The electron whose magnetic quantum number is (-2) is likely to have the principal quantum number
- (a) 2 only. (b) 3 only. (c) 4 only. (d) 3 or 4
- 11 The electron configuration of the oxide ion in MgO is
- (a) $1s^2, 2s^2, 2p^6$ (b) $1s^2, 2s^2, 2p^4$ (c) $1s^2, 2s^2, 2p^3$ (d) $1s^2, 2s^2, 2p^5$
- 12 What is the number of the electrons found in the penultimate principal level of the element whose atomic number is 28 ?
- (a) $2e^-$ (b) $8e^-$ (c) $14e^-$ (d) $16e^-$
- 13 The molecule of the element whose electron configuration ends with $2p^5$ is composed of
- (a) one atom. (b) two atoms. (c) three atoms. (d) four atoms.
- 14 In the samples:
- (1) 11 g of CO_2 (molar mass is 44 g/mol)
 (2) 6 L of NO_2 (at rtp).
 (3) 1 mol of hydrogen atoms.
 (4) 6.02×10^{23} atoms of nitrogen.
- The samples are equal in number of molecules in
- (a) (1) and (2) only. (b) (1), (2) and (3).
 (c) (2) and (3) only. (d) (2), (3) and (4).
- 15 The element with the smallest atomic radius of the following is
- (a) ${}_3\text{Li}$ (b) ${}_9\text{F}$ (c) ${}_{12}\text{Mg}$ (d) ${}_{17}\text{Cl}$
- 16 If the atomic radius of rubidium metal Rb is 253 pm, so its ionic radius equals
- (a) 148 pm (b) 253 pm (c) 275 pm (d) 300 pm

- 17** The third ionization potential is much greater than the second ionization potential in
- (a) neon $_{10}\text{Ne}$ (b) potassium $_{19}\text{K}$
 (c) magnesium $_{12}\text{Mg}$ (d) aluminum $_{13}\text{Al}$
- 18** Sulphuric acid does not react with
- (a) basic and neutral oxides. (b) acidic and neutral oxides.
 (c) amphoteric oxides. (d) alkaline oxides.
- 19** The atomic number of the element (X) exceeds the atomic number of the element (Y) by 6. Which of the following is correct ?
- (a) The elements (X) and (Y) belong to p-block and lie in the same period.
 (b) The elements (X) and (Y) lie in the same group.
 (c) The effective nuclear charge in element (Y) is greater than that in element (X).
 (d) (X) atom has a complete principal energy level.
- 20** What is the oxidation number of phosphorus in pyrophosphate ion (P_2O_7)⁴⁻ ?
- (a) +7 (b) +5 (c) -5 (d) +10

Answer the essay questions 21 : 23

- 21** What is the value of the subsidiary quantum number of an electron found in (4s) sublevel ?
-

- 22** The electrons of the representative element (M) are distributed in 2 principal levels, its last sublevel contains 3 unpaired electrons :

(1) Locate this element in the periodic table.

.....

(2) What is the block of this element ?

.....

- 23** Calculate the oxidation number of zinc in sodium zincate.
-

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9

